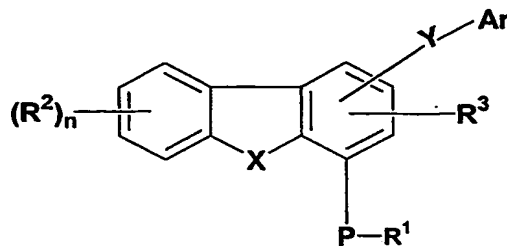


We Claim

1. A compound of general formula (1)



(1)

wherein:

R^1 , R^2 and R^3 may be same or different and are independently selected from the groups consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic ring, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl, acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each other, may be joined to form a saturated or unsaturated cyclic ring, which may optionally include up to two heteroatoms selected from O, NR^1 or S; wherein P represents oxygen or sulfur;

wherein n represents 0 – 4;

Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;

X is oxygen, $S(O)_m$ or NR^5 ;

R^5 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or

28 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 29 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-$
 30 $C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl,
 31 acetyl, halogen, $-OR^2$, $-SR^2$ and protecting groups

32 wherein m is 0, 1 or 2;

33 Y is $-C(O)NR^4$, $-NR^4SO_2$, $-SO_2NR^4$ or $-NR^4C(O)$;

34 R^4 is hydrogen, substituted or unsubstituted alkyl, hydroxyl, $-OR^1$, $-COOR^1$, substituted
 35 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;

36 and their analogs, their tautomers, their regioisomers, their stereoisomers, their
 37 enantiomers, their diastereomers, their polymorphs, their pharmaceutically acceptable
 38 salts, their N-oxides, their pharmaceutically acceptable solvates and their pharmaceutical
 39 compositions containing them or pharmaceutically acceptable salts thereof.

40

1 2. A compound according to claim 1 wherein the substituents in the
 2 'substituted alkyl', 'substituted alkoxy' 'substituted alkenyl' 'substituted alkynyl'
 3 'substituted cycloalkyl' 'substituted cycloalkylalkyl' 'substituted cycloalkenyl'
 4 'substituted arylalkyl' 'substituted aryl' 'substituted heterocyclic ring', 'substituted
 5 heteroaryl ring,' 'substituted heteroarylalkyl', 'substituted heterocyclalkyl ring',
 6 'substituted amino', 'substituted alkoxycarbonyl', 'substituted cyclic ring' 'substituted
 7 alkylcarbonyl', 'substituted alkylcarbonyloxy' and may be the same or different which
 8 one or more selected from the groups such as hydrogen, hydroxy, halogen, carboxyl,
 9 cyano, nitro, oxo ($=O$), thio($=S$), substituted or unsubstituted alkyl, substituted or
 10 unsubstituted alkoxy, substituted or unsubstituted alkenyl, substituted or unsubstituted
 11 alkynyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl,
 12 substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkenyl,
 13 substituted or unsubstituted amino, substituted or unsubstituted aryl, substituted or
 14 unsubstituted heteroaryl, 'substituted heterocyclalkyl ring' substituted or unsubstituted
 15 heteroarylalkyl, substituted or unsubstituted heterocyclic ring, substituted or unsubstituted
 16 guanidine, $-COOR^x$, $-C(O)R^x$, $-C(S)R^x$, $-C(O)NR^xR^y$, $-C(O)ONR^xR^y$, $-NR^xCONR^yR^z$, $-$
 17 $N(R^x)SOR^y$, $-N(R^x)SO_2R^y$, $-(=N-N(R^x)R^y)$, $-NR^xC(O)OR^y$, $-NR^xR^y$, $-NR^xC(O)R^y$, $-$
 18 $NR^xC(S)R^y$, $-NR^xC(S)NR^yR^z$, $-SONR^xR^y$, $-SO_2NR^xR^y$, $-OR^x$, $-OR^xC(O)NR^yR^z$, $-$
 19 $OR^xC(O)OR^y$, $-OC(O)R^x$, $-OC(O)NR^xR^y$, $-R^xNR^yC(O)R^z$, $-R^xOR^y$, $-R^xC(O)OR^y$, $-$
 20 $R^xC(O)NR^yR^z$, $-R^xC(O)R^x$, $-R^xOC(O)R^y$, $-SR^x$, $-SOR^x$, $-SO_2R^x$, $-ONO_2$, wherein R^x , R^y

21 and R^z in each of the above groups can be hydrogen atom, substituted or unsubstituted
22 alkyl, substituted or unsubstituted alkoxy, substituted or unsubstituted alkenyl, substituted
23 or unsubstituted alkynyl, substituted or unsubstituted aryl, substituted or unsubstituted
24 arylalkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted
25 cycloalkenyl, substituted or unsubstituted amino, substituted or unsubstituted aryl,
26 substituted or unsubstituted heteroaryl, 'substituted heterocyclalkyl ring' substituted or
27 unsubstituted heteroarylalkyl, substituted or unsubstituted heterocyclic ring,

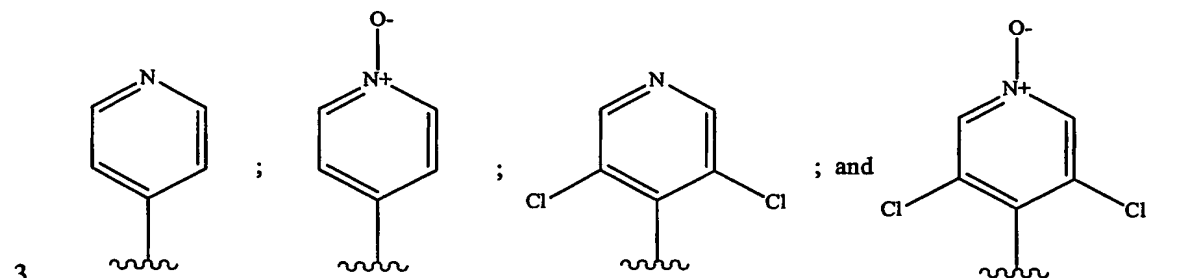
28

- 1 3. The compound according to claim 1 wherein R¹ is substituted alkyl.
- 1 4. The compound according to claim 3 wherein R¹ is CHF₂.
- 1 5. The compound according to claim 1 wherein R¹ is unsubstituted alkyl.
- 1 6. The compound according to claim 5 wherein R¹ is methyl.
- 1 7. The compound according to claims 1-5 or 6 wherein P is O or S.
- 1 8. The compound according to claim 7 where P is O.
- 1 9. The compound according to claims 1-7 or 8 wherein R² is selected from the group
2 consisting of substituted alkyl, halogen, cyano, nitro, amino, substituted heterocyclic and
3 SO₂NR¹R¹ and n=1.
- 1 10. The compound according to claim 9 wherein R² is chloro.
- 1 11. The compound according to claim 9 wherein R² is substituted alkyl.
- 1 12. The compound according to claim 11 wherein R² is CF₃.
- 1 13. The compound according to claim 9 wherein R² is -NH₂.
- 1 14. The compound according to claim 9 wherein R² is -SO₂NR¹R².
- 1 15. The compound according to claim 14 wherein R² is SO₂N(CH₃)₂.
- 1 16. The compound according to claims 1-14 or 15 wherein Y is -C(O)NH-.
- 1 17. The compound according to claims 1-15 or 16 wherein Ar is selected from the
2 group consisting of substituted or unsubstituted 4-pyridyl; substituted or unsubstituted 4-
3 pyridyl-N-oxide; substituted or unsubstituted 3 pyridyl, substituted or unsubstituted 3
4 pyridyl-N-oxide; substituted or unsubstituted 2 pyridyl; and substituted or unsubstituted 2
5 pyridyl N-oxide.

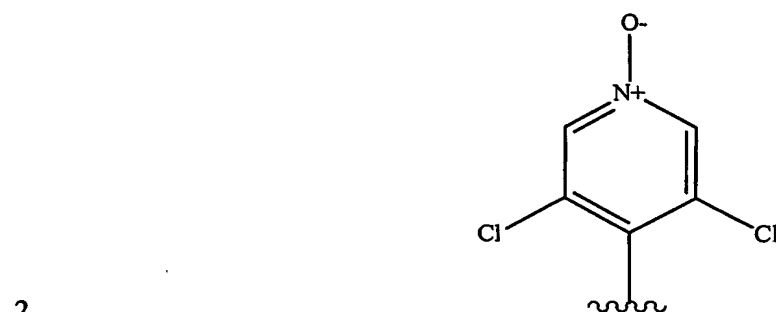
1 18. The compound according to claim 17 wherein said Ar is substituted with a
2 halogen.

1 19. The compound according to claim 18 wherein said halogen is chloro.

1 20. The compound according to claim 17 wherein Ar is selected from the group
2 consisting of



1 21. The compound according to claim 20 wherein Ar is



1 22. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy
2 dibenzo[b,d]furan-1-carboxamide.

1 23. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy
2 dibenzo[b,d]furan-1-carboxamide-N1-oxide.

1 24. A compound according to claim 1, N-(pyrid-4-yl)-4-methoxy dibenzo[b,d]furan-
2 1-carboxamide.

1 25. A compound according to claim 1, N-(pyrid-4-yl)-4-methoxy dibenzo[b,d]furan-
2 1-carboxamide-N1-oxide.

1 26. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-
2 trifluoromethyl dibenzo[b,d]furan-1-carboxamide.

1 27. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-
2 trifluoromethyl dibenzo[b,d]furan-1-carboxamide-N1-oxide.

- 1 28. A compound according to claim 1, N-(pyrid-4-yl)-4-methoxy-8-trifluoromethyl
2 dibenzo[b,d]furan-1-carboxamide.
- 1 29. A compound according to claim 1, N-(3, 5-dichloropyrid-4-yl)-4-
2 difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-carboxamide.
- 1 30. A compound according to claim 1, N-(3, 5-dichloropyrid-4-yl)-4-
2 difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-carboxamide-N1-oxide.
- 1 31. A compound according to claim 1, N-(pyrid-4-yl)-4-difluoromethoxy-8-
2 trifluoromethyl dibenzo[b,d]furan-1-carboxamide.
- 1 32. A compound according to claim 1, N-(3, 5-dichloropyrid-4-yl)-4-difluoromethoxy
2 dibenzo[b,d]furan-1-carboxamide.
- 1 33. A compound according to claim 1, N-(pyrid-4-yl)-4-difluoromethoxy
2 dibenzo[b,d]furan-1-carboxamide.
- 1 34. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-nitro
2 dibenzo[b,d]furan-1-carboxamide.
- 1 35. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-
2 chloro-dibenzo[b,d]furan-1-carboxamide.
- 1 36. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-
2 bromo-dibenzo[b,d]furan-1-carboxamide.
- 1 37. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-iodo-
2 dibenzo[b,d]furan-1-carboxamide.
- 1 38. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-
2 amino-dibenzo[b,d]furan-1-carboxamide.
- 1 39. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-
2 dibenzo[b,d]furan-1-carboxamide-N-oxide.
- 1 40. A compound according to claim 1, N4-(3, 5-dichloro-4-pyridyl) -9-benzyl -6-
2 chloro-1-methoxy-9H-4-carbazole carboxamide.
- 1 41. A compound according to claim 1, N4-(3, 5-dichloro-4-pyridyl) -6-chloro-9-
2 cyclohexylmethyl -1-methoxy-9H-4-carbazole carboxamide.

- 1 42. A compound according to claim 1, N4-(3, 5-dichloro-4-pyridyl) -6-chloro-9-(4-
2 fluorobenzyl)-1-methoxy-9H-4-carbazole carboxamide.
- 1 43. A compound according to claim 1, N4-(3, 5-dichloro-4-pyridyl) -6-chloro-9-(4-
2 methoxybenzyl)-1-methoxy-9H-4-carbazolecarboxamide.
- 1 44. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-
2 cyano-dibenzo[b,d]furan-1-carboxamide.
- 1 45. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-
2 8-nitro-dibenzo[b,d]furan-1-carboxamide
- 1 46. A compound according to claim 1, N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-
2 8-amino-dibenzo[b,d]furan-1-carboxamide
- 3
- 1 47. A compound according to claim 1 selected from the group consisting of:
- 2 N-(3, 5-dichloropyrid-4-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;
- 3 N-(3, 5-dichloropyrid-4-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
- 4 N-(pyrid-4-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;
- 5 N-(pyrid-4-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
- 6 N-(2-chloropyrid-3-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;
- 7 N-(4-fluorophenyl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;
- 8 N-(pyrid-3-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;
- 9 N-(pyrid-3-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
- 10 N-(3, 5-dichloropyrid-4-yl)-4-methoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
11 carboxamide;
- 12 N-(3, 5-dichloropyrid-4-yl)-4-methoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
13 carboxamide-N1-oxide;
- 14 N-(pyrid-4-yl)-4-methoxy-8-trifluoromethyl dibenzo[b,d]furan-1-carboxamide;
- 15 N-(3, 5-dichloropyrid-4-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-
16 1-carboxamide;
- 17 N-(3, 5-dichloropyrid-4-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-
18 1-carboxamide-N1-oxide;
- 19 N-(pyrid-4-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
20 carboxamide;

21 N-(pyrid-4-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
22 carboxamide-N1-oxide;
23 N-(pyrid-3-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
24 carboxamide;
25 N-(pyrid-3-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
26 carboxamide-N1-oxide;
27 N-(pyrid-2-yl)-4-difluoromethoxy-8-trifluoromethyl dibenzo[b,d]furan-1-
28 carboxamide;
29 N-(3, 5-dichloropyrid-4-yl)-4-difluoromethoxy dibenzo[b,d]furan-1-carboxamide; and
30 N-(pyrid-4-yl)-4-difluoromethoxy dibenzo[b,d]furan-1-carboxamide.
31

1 48. A compound according to claim 1 selected from the group consisting of:
2 N-(pyrid-4-yl)-4-difluoromethoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
3 N-(pyrid-3-yl)-4-difluoromethoxy dibenzo[b,d]furan-1-carboxamide;
4 N-(pyrid-3-yl)-4-difluoromethoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
5 N-(5-chloropyrid-2-yl)-4-difluoromethoxy dibenzo[b,d]furan-1-carboxamide;
6 N-(3, 5-dichloropyrid-4-yl)-4-cyclopropylmethoxy dibenzo[b,d]furan-1-carboxamide;
7 N-(3, 5-dichloropyrid-4-yl)-4-cyclopropylmethoxy dibenzo[b,d]furan-1-carboxamide-
8 N1-oxide;
9 N-(pyrid-4-yl)-4-cyclopropylmethoxy dibenzo[b,d]furan-1-carboxamide;
10 N-(pyrid-4-yl)-4-cyclopropylmethoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
11 N-(pyrid-3-yl)-4-cyclopropylmethoxy dibenzo[b,d]furan-1-carboxamide;
12 N-(pyrid-3-yl)-4-cyclopropylmethoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
13 N-(3, 5-dichloropyrid-4-yl)-4-isopropoxy dibenzo[b,d]furan-1-carboxamide;
14 N-(3, 5-dichloropyrid-4-yl)-4-isopropoxy dibenzo[b,d]furan-1-carboxamide-N1-
15 oxide;
16 N-(pyrid-4-yl)-4-isopropoxy dibenzo[b,d]furan-1-carboxamide;
17 N-(pyrid-4-yl)-4-isopropoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
18 N-(pyrid-3-yl)-4-isopropoxy dibenzo[b,d]furan-1-carboxamide;
19 N-(pyrid-3-yl)-4-isopropoxy dibenzo[b,d]furan-1-carboxamide-N1-oxide;
20 N-(3, 5-dichloropyrid-4-yl)-4-benzyloxy dibenzo[b,d]furan-1-carboxamide;
21 N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-nitro dibenzo[b,d]furan-1-carboxamide
22 N-(pyrid-4-yl)-4-methoxy-8-nitro dibenzo[b,d]furan-1-carboxamide; and

23 N-(pyrid-3-yl)-4-methoxy-8-nitro dibenzo[b,d]furan-1-carboxamide.

24

1 49. A compound according to claim 1 selected from the group consisting of:

2 N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-chloro-dibenzo[b,d]furan-1-carboxamide;

3 N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-bromo-dibenzo[b,d]furan-1-carboxamide;

4 N-(pyrid-4-yl)-4-methoxy-8-bromo-dibenzo[b,d]furan-1-carboxamide;

5 N-(pyrid-3-yl)-4-methoxy-8-bromo-dibenzo[b,d]furan-1-carboxamide;

6 N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-iodo-dibenzo[b,d]furan-1-carboxamide;

7 N-(pyrid-4-yl)-4-methoxy-8-iodo-dibenzo[b,d]furan-1-carboxamide;

8 N-(pyrid-3-yl)-4-methoxy-8-iodo-dibenzo[b,d]furan-1-carboxamide;

9 N-(4-methylpyrimid-2-yl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;

10 N-(2,5-dichlorophenyl)-4-methoxy dibenzo[b,d]furan-1-carboxamide;

11 N-(3, 5-dichloropyrid-4-yl)-4-ethoxycarbomethoxy dibenzo[b,d]furan-1-

12 carboxamide;

13 N-(3, 5-dichloropyrid-4-yl)-4-hydroxycarbomethoxydibenzo[b,d]furan-1-

14 carboxamide;

15 N-(3, 5-dichloropyrid-4-yl)-4-methoxy dibenzo[b,d]furan-2-carboxamide;

16 N-(3, 5-dichloropyrid-4-yl)-4-methoxy dibenzo[b,d]furan-3-carboxamide;

17 N4-(4-methoxy dibenzo[b,d]furan-1-yl) isonicotinamide;

18 N-(3, 5-dichloropyrid-4-yl)-4-methoxy dibenzo[b,d]furan-1-sulfonamide;

19 N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-amino-dibenzo[b,d]furan-1-carboxamide;

20 N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-dibenzo[b,d]furan-1-carboxamide-N-

21 oxide;

22 N-(3,5-dichloropyrid-4-yl)-4-methoxy-8-cyano-dibenzo[b,d]furan-1-carboxamide;

23 N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-8-nitro-dibenzo[b,d]furan-1-

24 carboxamide;

25 N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-8-amino-dibenzo[b,d]furan-1-

26 carboxamide;

27 3,5-Dichloro-4-(4-ethoxydibenzo[b,d]furan-1-ylcarboxamido)pyridine; and

28 N1-Benzyl-4-cyclopentyloxydibenzo[b,d]furan-1-carboxamide.

29

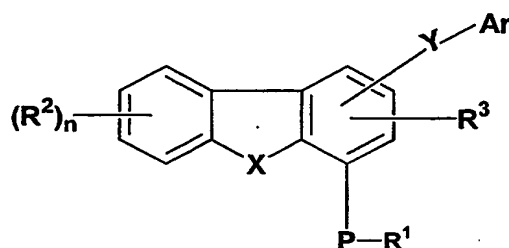
- 1 50. A compound according to claim 1 selected from the group consisting of:
2 4-(4-Cyclopentyloxydibenzo[*b,d*]furan-1-ylcarboxamido)pyridine;
3 3,5-Dichloro-4-(4-cyclopentyloxydibenzo[*b,d*]furan-1-ylcarboxamido)pyridine;
4 4-(4-Methylsulfanyldibenzo[*b,d*]furan-1-ylcarboxamido)pyridine;
5 *N*3-(4-Methoxydibenzo[*b,d*]furan-1-yl)nicotinamide;
6 *N*1-Benzyl-4-methoxydibenzo[*b,d*]furan-1-sulfonamide;
7 4-(4-Methoxydibenzo[*b,d*]furan-1-ylsulfonamido)pyridine;
8 3,5-Dichloro-4-(4-ethoxydibenzo[*b,d*]furan-1-ylcarboxamido)pyridine-*N*-oxide;
9 3,5-Dichloro-4-(4-cyclopentyloxydibenzo[*b,d*]furan-1-ylcarboxamido)pyridine-*N*-
10 oxide;
11 *N*-Formyl-1-methoxy-4-[4-methoxyphenylaminosulphonyl]-9H-carbazole;
12 1-methoxy-4-[4-methoxyphenylaminosulphonyl]-9H-carbazole.;
13 *N*-Formyl-1-methoxy-4-[4-methylphenylaminosulphonyl]-9H-carbazole;
14 1-methoxy-4-[4-methylphenylaminosulphonyl]-9H-carbazole;
15 1-methoxy-4-[4-methylphenylaminosulphonyl-*N'*-methyl]-9H-carbazole;
16 1-methoxy-4-[4-methylphenylaminosulphonyl-*N'*-methyl]-9methyl carbazole;
17 1-methoxy-4-[4-pyridinylaminosulphonyl]-9H-carbazole;
18 *N*4-(2,6-Dichlorophenyl)-1-methoxy-9H-4-carbazolsulphonamide;
19 *N*4-(2,6-Dichlorophenyl)-9-formyl-1-methoxy-9H-4-carbazolsulphonamide;
20 *N*4-(4-pyridyl)-1-methoxy-9H-4-carbazole carboxamide;
21 *N*4-(3,5-dichloro-4-pyridyl)-1-methoxy-9H-4-carbazole carboxamide; and
22 *N*4-(3, 5-dichloro-4-pyridyl) -6-chloro-1-methoxy-9H-4-carbazole carboxamide.
23
- 1 51. A compound according to claim 1 selected from the group consisting of:
2 *N*4-(3, 5-dichloro-4-pyridyl) -9-benzyl -6-chloro-1-methoxy-9H-4-carbazole
3 carboxamide;
4 *N*4-(3, 5-dichloro-4-pyridyl) -6-chloro-9-cyclohexylmethyl -1-methoxy-9H-4-
5 carbazole carboxamide;
6 *N*4-(3, 5-dichloro-4-pyridyl) -6-chloro-9-(4-fluorobenzyl)-1-methoxy-9H-4-carbazole
7 carboxamide;
8 *N*4-(3, 5-dichloro-4-pyridyl) -6-chloro-9-(4-methoxybenzyl)-1-methoxy-9H-4-
9 carbazolecarboxamide;
10 *N*4-(3, 5-dichloro-4-pyridyl)-9-(4-fluorobenzyl)-1-methoxy-9H- 4-carbazole
11 carboxamide;

- 12 N4-(4-pyridyl)-9-(4-fluorobenzyl)-1-methoxy-9H-4-carbazole carboxamide;
- 13 N4-(3, 5-dichloro-4-pyridyl)-9-benzyl-1-methoxy-9H-4-carbazolecarboxamide;
- 14 N4-(3, 5-dichloro-4-pyridyl)-9-benzyl-1-ethoxy-9H-4-carbazolecarboxamide;
- 15 N4-(3, 5-dichloro-4-pyridyl)-9-benzyl-6-chloro-1-ethoxy-9H-4-
- 16 carbazolecarboxamide;
- 17 N4-(4-pyridyl)-9-benzyl-1-ethoxy-9H-4-carbazolecarboxamide;
- 18 N4-(3-pyridyl)-6-chloro-9-(4-fluorobenzyl)-1-methoxy-9H-4-carbazolecarboxamide;
- 19 N4-(4-pyridyl)-6-chloro-9-(4-fluorobenzyl)-1-methoxy-9H-4-carbazolecarboxamide;
- 20 N4-(3, 5-dichloro-4-pyridyl) 8-chloro-9-cyclohexylmethyl-1-methoxy-9H-4-
- 21 carbazole carboxamide;
- 22 N4-(3, 5-dichloro-4-pyridyl)- 8-chloro-9-(4-Fluorobenzyl)-1-methoxy-9H- 4-
- 23 carbazole carboxamide;
- 24 N4-(3, 5-dichloro-4-pyridyl)-6-chloro-1-methoxy-9-methyl-9H-4-carbazole
- 25 carboxamide;
- 26 N4-(3,5-dichloro-4-pyridyl-N-oxide)-6-chloro-9-(4-fluorobenzyl)-1-methoxy-9H-4-
- 27 carbazolecarboxamide;
- 28 N4-(3,5-dichloro-4-pyridyl-N-oxide)-6-chloro-9-(4-methoxybenzyl)-1-methoxy-9H-
- 29 4-carbazolecarboxamide;
- 30 N4-(3,5-dichloro-4-pyridyl-N-oxide)-6-chloro-9-cyclohexylmethyl-1-methoxy-9H-4-
- 31 carbazolecarboxamide;
- 32 N4-(3, 5-dichloro-4-pyridyl)-9-methyl-1-methoxy-9H-4-carbazolecarboxamide; and
- 33 3,5-Dichloro-4-(4-methoxydibenzo[b,d]-thiophen-1-ylcarboxamido)pyridine.
- 34

- 1 52. A compound according to claim 1 selected from the group consisting of:
- 2 3,5-dichloro-4-(4-cyclopentyloxydibenzo[b,d]-thiophen-1-ylcarboxamido)pyridine;
- 3 N1 (4-methoxyphenyl)-4-methoxydibenzo[b,d]thiophene-1-carboxamide;
- 4 N1-(4-methoxyphenyl)-4-methoxydibenzo[b,d]thiophene-1-carboxamide-5,5-dioxide;
- 5 N1-(4-chlorophenyl)-4-methoxydibenzo[b,d]thiophene-1-carboxamide;
- 6 4-(4-methoxydibenzo[b, d]thiophene-1-ylcarboxamido)pyridine;
- 7 4-(4-cylopentyloxydibezo[b,d]thiophene-1-ylcarboxamido)pyridine;
- 8 3,5-dichloro-4-(4-cyclopentyloxydibenzo[b,d]-thiophen-5,5-dioxide-1-
- 9 ylcarboxamido)pyridine-N-oxide;
- 10 3,5-dichloro-4-(4-methoxydibenzo[b,d]-thiophen-5,5-dioxide-1-ylcarboxamido)
- 11 pyridine-N-oxide;

- 12 3,5 Dichloro-4-(4-methoxydibenzo[b,d]-thiophen-5,5-dioxide-1-ylcarboxamido)
 13 pyridine;
 14 3,5 Dichloro-4-(4-difluoromethoxydibenzo[b,d]-thiophen-1-ylcarboxamido) pyridine;
 15 N1-(4-methoxyphenyl)-4-methoxydibenzo[b,d]thiophene-1-sulfonamide;
 16 2-(4-Methoxydibenzo[b,d] thiophen-1-ylcarboxamido)-pyridine;
 17 4-(4-Ethoxydibenzo[b,d] thiophen-1-ylcarboxamido)-pyridine;
 18 N1-(4-methoxyphenyl)-N8, 8-dimethyl-4-methoxydibenzo[b,d] thiophen-8,1-
 19 disulfonamide;
 20 3-(4-Methoxydibenzo[b,d] thiophen-1-ylcarboxamido)-pyridine;
 21 3,5-Dichloro-4-(6-ethyl-4-methoxydibenzo[b,d]-thiophen-1-ylcarboxamido)pyridine;
 22 3,5,dichloro-4-(4-ethoxy-dibenzo[b, d]thiophen-1-yl-carboxamido)pyridine;
 23 3-(4-Methoxydibenzo[b,d] thiophene-5,5-dioxide-1-ylcarboxamido)-pyridine;
 24 3,5-Dichloro-4-(4-benzyloxydibenzo[b,d]-thiophen-1-ylcarboxamido)pyridine; and
 25 N-(3,5-dichloropyrid-4-yl)-4-difluoromethoxy-8-(pyrrolidine-2-one-1-yl)-
 26 dibenzo[b,d]furan-1-carboxamide.

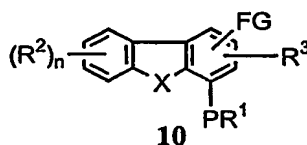
1 53. A method for the preparation of compounds of general formula (1)



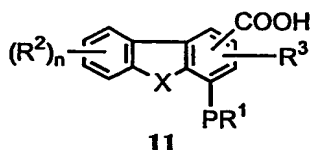
(1)

R¹, R² and R³ may be same or different and are independently selected from the groups consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, -C(O)-R¹, -C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl, acetyl, halogen, -OR¹, -SR¹, protecting groups or when two R² substituents ortho to each

- 14 other, may be joined to a form a saturated or unsaturated cyclic ring, which may
 15 optionally include up to two heteroatoms selected from O, NR¹ or S;
 16 wherein P represents oxygen or sulfur;
 17 wherein n represents 0 – 4;
 18 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 19 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;
 20 X is oxygen, S(O)_m or NR⁵;
 21 R⁵ represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 22 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 23 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 24 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 25 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 26 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, -C(O)-R¹, -
 27 C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl,
 28 acetyl, halogen, -OR², -SR² and protecting groups
 29 m is 0, 1 or 2;
 30 Y is -C(O)NR⁴;
 31
 32 R⁴ is hydrogen, substituted or unsubstituted alkyl, hydroxyl, -OR¹, -COOR¹, substituted
 33 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 34 comprising the steps of:
 35
 36 (a) reacting the compound of general formula (10)

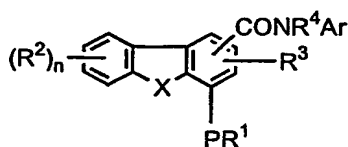


- 37
 38 when FG is methyl then the methyl group is oxidized using manganese or chromium
 39 reagents to the carboxylic acid group; if FG is cyano group then the cyano group is
 40 hydrolysed to the carboxylic acid; if FG is bromine then it is transformed to carboxylic
 41 acid reaction with lithium followed by treatment with carbon dioxide) to get general
 42 formula (11)



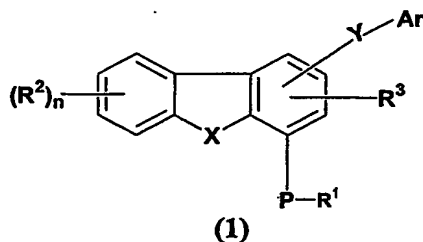
(where R^1 , R^2 , R^3 and P have the meanings described above; FG represents substituted or unsubstituted alkyl, formyl, cyano, halogen, nitro, amino)

(b) reacting the compound of formula (11) with an amine of the formula $ArNHR^4$ to get a compound of formula (1)



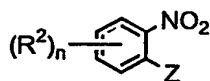
(c) optionally converting the compound of formula (1) into its corresponding N-oxides by the action of a peracid.

54. A method for the preparation of compounds of general formula (1)



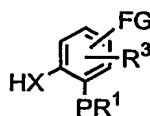
R^1 , R^2 and R^3 may be same or different and are independently selected from the group consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, -

- 12 $C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl,
 13 acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each
 14 other, may be joined to a form a saturated or unsaturated cyclic ring, which may
 15 optionally include up to two heteroatoms selected from O, NR^1 or S;
 16 wherein P represents oxygen or sulfur;
 17 wherein n represents 0 – 4;
 18 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 19 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;
 20 X is oxygen, $S(O)_m$ or NR^5
 21 R^5 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 22 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 23 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 24 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 25 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 26 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-$
 27 $C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl,
 28 acetyl, halogen, $-OR^2$, $-SR^2$ and protecting groups
 29 m is 0, 1 or 2;
 30 Y is $-C(O)NR^4$;
 31 R^4 is hydrogen, substituted or unsubstituted alkyl, hydroxyl, $-OR^1$, $-COOR^1$, substituted
 32 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 33
 34 comprising the steps of
 35 (a) reacting the compound of general formula (12) where Z is a halogen and R^2 have
 36 the meaning described above



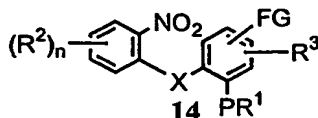
12

37 with a substituted or unsubstituted aromatic group of the formula (13)

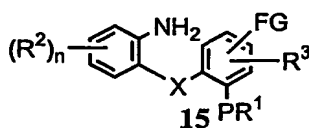


13

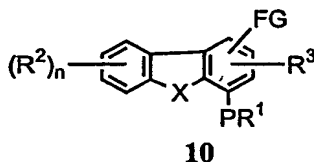
41 wherein FG is selected from the group consisting of alkyl, formyl, cyano, halogen, nitro,
 42 amino, and carboxylic acid group; under basic conditions to get the intermediate of
 43 formula (14)
 44



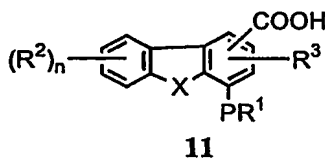
45
 46 (b) reducing the compound of general formula (14) to obtain the compound of
 47 general formula (15)
 48



49
 50 (c) cyclizing of the intermediate of general formula (15) can be cyclized to tricyclic
 51 compounds of general formula (10) by using standard diazotization method using
 52 NaNO₂/HCl followed by coupling using cuprous oxide in 0.1N sulfuric acid or
 53 copper in DMSO.



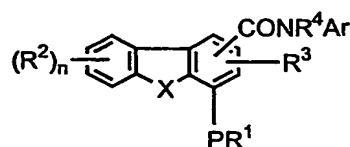
54
 55 (d) converting the compound of general formula (10) to general formula (11) when
 56 FG is methyl then the methyl group is oxidized using manganese or chromium
 57 reagents if FG is cyano group then the cyano group is hydrolysed to the
 58 carboxylic acid; if FG is bromine then it is transformed to carboxylic acid via
 59 reaction with lithium metal followed by treatment with carbon dioxide. with the
 60 proviso that FG is not carboxylic acid



61
 62 the symbols R1, R2, R3, P and P have the meanings described above.
 63

64 (e) reacting the compound of the formula (11) with an amine of the formula ArNHR⁴
 65 to yield the compound of formula 1

66



(1)

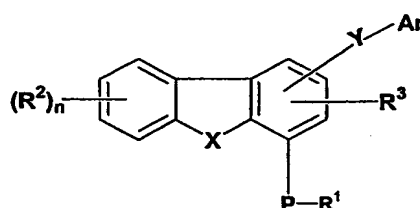
67

68 (f) optionally converting the compounds of formula (1) to the corresponding N-
 69 oxides by the action of a peracid.

70

1 55. A method for the preparation of compounds of general formula (1)

2



(1)

3

4

5 R^1 , R^2 and R^3 may be same or different and are independently selected from the groups
 6 consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 7 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 8 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 9 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 10 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 11 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-$
 12 $C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl,
 13 acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each
 14 other, may be joined to form a saturated or unsaturated cyclic ring, which may
 15 optionally include up to two heteroatoms selected from O, NR^1 or S;

16 wherein P represents oxygen or sulfur;

17 wherein n represents 0 – 4;

18 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 19 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;

20 X is oxygen, $S(O)_m$ or NR^5 ;

21 R^5 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 22 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,

23 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 24 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 25 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 26 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-\text{C}(\text{O})-\text{R}^1$, $-\text{C}(\text{O})\text{O}-\text{R}^1$, $-\text{C}(\text{O})\text{NR}^1\text{R}^1$, $-\text{S}(\text{O})_m-\text{R}^1$, $-\text{S}(\text{O})_m-\text{NR}^1\text{R}^1$, nitro, $-\text{OH}$, cyano, amino, formyl,
 28 acetyl, halogen, $-\text{OR}^2$, $-\text{SR}^2$ and protecting groups

29 m is 0, 1 or 2;

30 Y is $-\text{C}(\text{O})\text{NR}^4$;

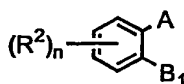
31 R^4 is hydrogen, substituted or unsubstituted alkyl, hydroxyl, $-\text{OR}^1$, $-\text{COOR}^1$, substituted
 32 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;

33

34 comprising the steps of

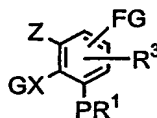
35 (a) reacting the compound of general formulas (16) and (17)

36



37

16



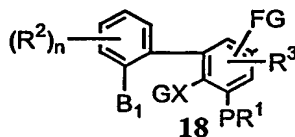
38

17

39

40 where A is halogen, $-\text{OMs}$ or $-\text{OTs}$ (Ms = methanesulfonyl group; Ts = p-toluenesulfonyl
 41 group) or $-\text{B}(\text{OH})_2$; B_1 is halogen, G is a protecting group selected from the group
 42 consisting of benzyloxy carbonyl, t-butyloxycarbonyl, isopropyl, cyclopentyl, allyl, acetyl
 43 and benzyl, FG is selected from the group consisting of alkyl, formyl, cyano, halogen,
 44 nitro, amino, and carboxylic acid group and Z is halogen and R^2 have the meaning
 45 described above

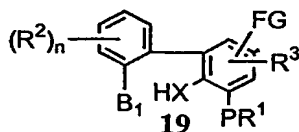
46 to yield the compounds of general formula (18)



47

18

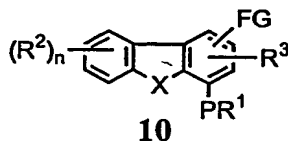
- 48 (b) Deprotecting intermediate (18) to intermediate of general formula (19)



49

- 50 (c) cyclizing the intermediate of general formula (19)

51 to tricyclic compounds of general formula (10) in the presence of basic conditions



52

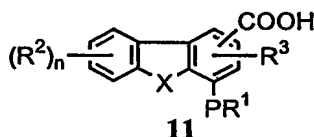
- 53 (d) converting of the compound of general formula (10) to general formula (11)

54 where if FG is methyl the methyl group is oxidized using manganese or

55 chromium reagents; if FG is cyano group then the cyano group is hydrolysed; if

56 FG is bromine it is reacted with lithium metal followed by treatment with carbon

57 dioxide), with the proviso that FG is not carboxylic acid



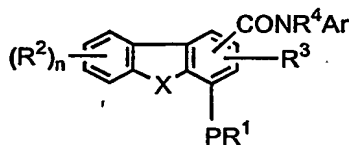
58

59 the symbols R¹, R², R³, P and P have the meanings described above

- 60 (e) reacting the novel compound of the formula (11) with an amine of the formula

61 ArNHR⁴ to yield the compounds of formula 1

62



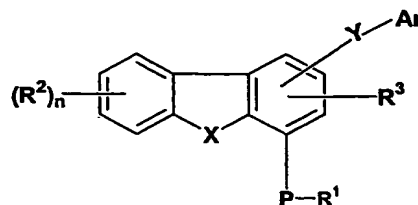
63

- 64 (f) optionally converting the compounds of formula 1 are then converted into the

65 corresponding N-oxides by the action of a peracid.

66

56. A method for the preparation of compounds of general formula (1)



(1)

R^1 , R^2 and R^3 may be same or different and are independently selected from the groups consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl, acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each other, may be joined to form a saturated or unsaturated cyclic ring, which may optionally include up to two heteroatoms selected from O, NR^1 or S;

wherein P represents oxygen or sulfur;

wherein n represents 0 – 4;

Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;

X is oxygen, $S(O)_m$ or NR^5 ;

R^5 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl, acetyl, halogen, $-OR^2$, $-SR^2$ and protecting groups

m is 0, 1 or 2;

Y is $-C(O)NR^4$;

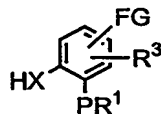
31 R^4 is hydrogen, substituted or unsubstituted alkyl, hydroxyl, $-OR^1$, $-COOR^1$, substituted
 32 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring;

33

34 comprising the steps of

35 (a) reacting the compounds of general formulae (13) and (20) in the presence of basic
 36 conditions

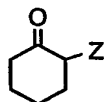
37



13

38

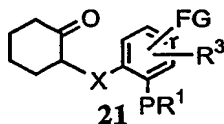
39



20

40

41 to yield the compounds of general formula (21)

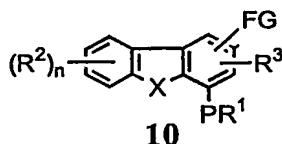


21

42

43 wherein FG is selected from the group consisting of alkyl, formyl, cyano, halogen, nitro,
 44 amino, and carboxylic acid group;

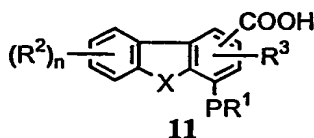
45 (b) cyclizing the intermediate of general formula (21) in the presence of acidic
 46 conditions followed oxidation give tricyclic compounds of general formula (10)



10

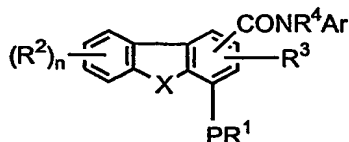
47

48 (c) converting the compound of general formula (10) is transformed to general
 49 formula (11) where if FG is methyl then the methyl group is oxidized using
 50 manganese or chromium reagents to the carboxylic acid group; if FG is cyano
 51 group then the cyano group is hydrolysed to the carboxylic acid; if FG is bromine
 52 then it could be transformed to carboxylic acid via reaction with lithium followed
 53 by treatment with carbon dioxide with the proviso that FG is not carboxylic acid



the symbols R^1 , R^2 , R^3 , P and P have the meanings described above

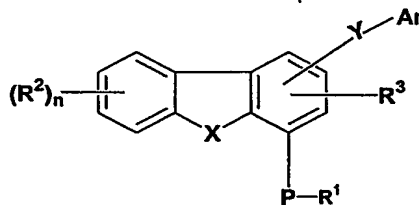
(d) reacting the novel compound of the formula (11) with an amine of the formula $ArNHR^4$ to yield the novel compounds of formula 1



; and

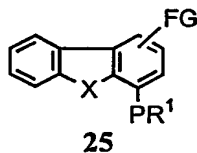
(e) optionally converting the desired compounds of formula 1 into the corresponding N-oxides by the action of a peracid.

57. A method for the preparation of compounds of general formula (1)

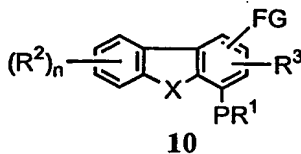


R^1 , R^2 and R^3 may be same or different and are independently selected from the groups consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl, acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each other, may be joined to form a saturated or unsaturated cyclic ring, which may optionally include up to two heteroatoms selected from O, NR^1 or S; wherein P represents oxygen or sulfur;

- 17 wherein n represents 0 – 4;
 18 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 19 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;
 20 X is oxygen, S(O)_m or NR⁵;
 21 R⁵ represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 22 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 23 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 24 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 25 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 26 unsubstituted heterocyclylalkyl, substituted or unsubstituted heteroarylalkyl, -C(O)-R¹, -
 27 C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl,
 28 acetyl, halogen, -OR², -SR² and protecting groups
 29 m is 0, 1 or 2;
 30 Y is -C(O)NR⁴;
 31 R⁴ is hydrogen, substituted or unsubstituted alkyl, hydroxyl, -OR¹, -COOR¹, substituted
 32 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 33
 34 comprising the steps of
 35 (a) reacting the compound of general formulas (25) with an electrophile
 36

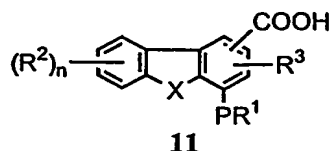


- 37
 38 wherein FG is selected from the group consisting of alkyl, formyl, cyano, halogen, nitro,
 39 amino, and carboxylic acid group;
 40 to get the compounds of general formula (10)
 41



- 42
 43
 44 (b) Converting the compound of general formula (10) is converted into general
 45 formula (11) when if FG is methyl then the methyl group is oxidized using

46 manganese or chromium reagents to the carboxylic acid group; if FG is cyano
 47 group then the cyano group is hydrolysed to the carboxylic acid; if FG is bromine
 48 then it is transformed to carboxylic acid via reaction with lithium metal followed
 49 by treatment with carbon dioxide

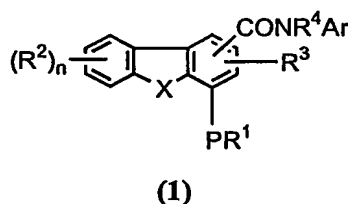


50

51

52 the symbols R^1 , R^2 , R^3 and P have the meanings described above

53 (c) reacting the novel compound of the formula (11) with an amine of the formula
 54 $ArNHR^4$ to yield the compounds of formula 1

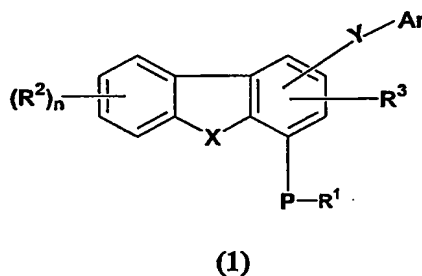


55

56 (d) optionally converting the desired compounds of formula (1) are then converted
 57 into the corresponding N-oxides by the action of a peracid.

58

1 58. A method for the preparation of compounds of general formula (1)



2

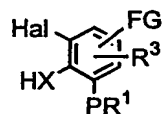
3

4

5 R^1 , R^2 and R^3 may be same or different and are independently selected from the groups
 6 consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 7 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 8 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 9 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 10 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 11 unsubstituted heterocyclylalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, -

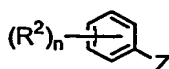
12 C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl,
13 acetyl, halogen, -OR¹, -SR¹, protecting groups or when two R² substituents ortho to each
14 other, may be joined to a form a saturated or unsaturated cyclic ring, which may
15 optionally include up to two heteroatoms selected from O, NR¹ or S;
16 wherein P represents oxygen or sulfur;
17 wherein n represents 0 – 4;
18 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
19 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;
20 Preferably Ar is optionally substituted phenyl, optionally substituted benzyl, optionally
21 substituted pyrimidine, optionally substituted pyridyl selected from 4-pyridyl, 3-pyridyl
22 and 2-pyridyl or optionally substituted pyridyl-N-oxide selected from 4-pyridyl-N-Oxide,
23 3-pyridyl-N-Oxide and 2-pyridyl-N-Oxide in which optional substituents (one or more)
24 may be same or different and are independently selected from the groups consisting of
25 hydrogen, hydroxyl, halogen, cyano, nitro, carboxyl, trifluoroalkyl, substituted or
26 unsubstituted alkyl, substituted or unsubstituted alkoxy, substituted or unsubstituted
27 alkoxycarbonyl, substituted or unsubstituted alkylcarbonyl, substituted or unsubstituted
28 alkylcarbonyloxy, substituted or unsubstituted amino or mono or di substituted or
29 unsubstituted alkylamino
30 X is oxygen, S(O)_m or NR⁵;
31 R⁵ represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
32 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
33 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
34 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
35 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
36 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, -C(O)-R¹, -
37 C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl,
38 acetyl, halogen, -OR², -SR² and protecting groups
39 m is 0, 1 or 2;
40 Y is -C(O)NR⁴;
41 R⁴ is hydrogen, substituted or unsubstituted alkyl, hydroxyl, -OR¹, -COOR¹, substituted
42 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ; comprising the steps
43 of

- 44 (a) reacting the compounds of general formulae (13.a) and (23) in the presence of
 45 basic conditions



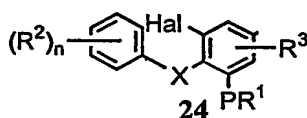
13.a

+



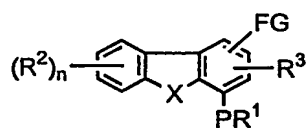
23

- 46
 47
 48
 49 wherein P, X, R¹, R² and R³ have the meanings described above and wherein Z is a
 50 halogen, FG is alkyl, formyl, cyano, halogen, nitro, amino, and carboxylic acid group;
 51 Hal is halogen to yield the compounds of general formula (24)



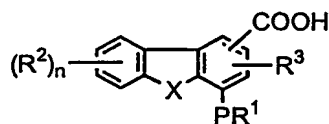
24

- 52
 53
 54 where all the symbols defined above;
 55 (b) cyclizing the intermediate of general formula (24) to tricyclic compounds of
 56 general formula (10) in the presence of palladium catalyzed coupling conditions



10

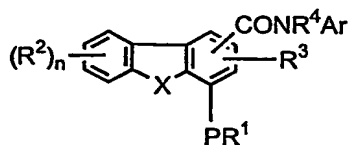
- 57
 58 (c) converting the compound of general formula (10) can be transformed to general
 59 formula (11) where if FG is methyl then the methyl group is oxidized using
 60 manganese or chromium reagents to the carboxylic acid group; if FG is cyano
 61 group then the cyano group is hydrolysed to the carboxylic acid; if FG is bromine
 62 then it is transformed to carboxylic acid via reaction with lithium followed by
 63 treatment with carbon dioxide with the proviso that FG is not carboxylic acid



11

- 64
 65 the symbols R¹, R², R³, P and P have the meanings described above

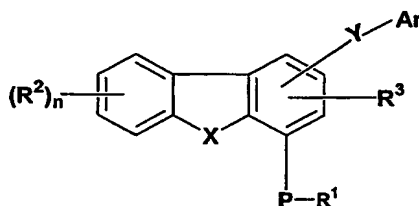
- 66 (d) reacting the compound of the formula (11) with an appropriate amine of the
 67 formula ArNHR^4 to get the novel compounds of formula 1
 68



(1)

- 69
 70 (e) optionally the compounds of formula 1 are then converted into the corresponding
 71 N-oxides by the action of a peracid.
 72

- 1 59. A method for the preparation of compounds of general formula (1)
 2

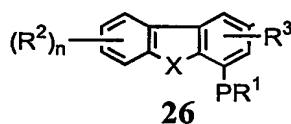


(1)

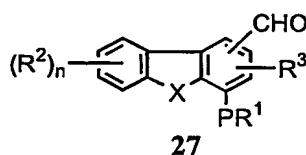
- 3
 4
 5 Y is $-\text{C}(\text{O})\text{NR}^4$
 6 R^1 , R^2 and R^3 may be same or different and are independently selected from the groups
 7 consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 8 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 9 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 10 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 11 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 12 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-\text{C}(\text{O})-\text{R}^1$, $-\text{C}(\text{O})\text{O}-\text{R}^1$, $-\text{C}(\text{O})\text{NR}^1\text{R}^1$, $-\text{S}(\text{O})_m-\text{R}^1$, $-\text{S}(\text{O})_m-\text{NR}^1\text{R}^1$, nitro, $-\text{OH}$, cyano, amino, formyl,
 14 acetyl, halogen, $-\text{OR}^1$, $-\text{SR}^1$, protecting groups or when two R^2 substituents ortho to each
 15 other, may be joined to a form a saturated or unsaturated cyclic ring, which may
 16 optionally include up to two heteroatoms selected from O, NR^1 or S;
 17 wherein P represents oxygen or sulfur;
 18 wherein n represents 0 – 4;
 19 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 20 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;

- 21 X is oxygen, S(O)_m or NR⁵;
 22 R⁵ represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 23 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 24 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 25 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 26 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 27 unsubstituted heterocyclylalkyl, substituted or unsubstituted heteroarylalkyl, -C(O)-R¹, -
 28 C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl,
 29 acetyl, halogen, -OR², -SR² and protecting groups
 30 m is 0, 1 or 2;
 31 Y is -C(O)NR⁴;
 32 R⁴ is hydrogen, substituted or unsubstituted alkyl, hydroxyl, -OR¹, -COOR¹, substituted
 33 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 34 comprising the steps of

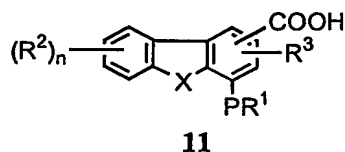
- 36 (a) Formylation of the compound of general formula (26)



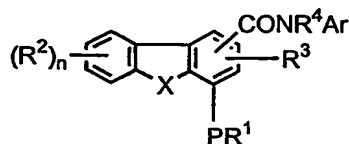
- 38 by formylation oxidation of the aldehyde group of the formula (27)



- 41
 42
 43 to give carboxylic acid group of general formula (11)



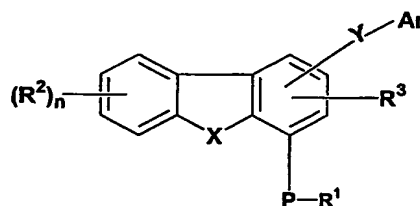
- 47 (b) reacting the novel compound of the formula (11) with an amine of the formula
 48 ArNHR^4 to get the compounds of formula (1)
 49



(1)

- 50
 51 (c) optionally converting the compounds of formula 1 into the corresponding N-
 52 oxides by the action of a peracid.
 53

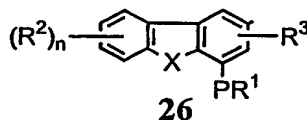
- 1 60. A process for the preparation of compounds of general formula (1)
 2



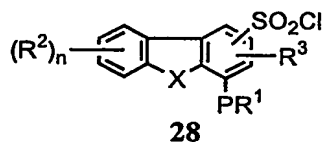
(1)

- 3
 4
 5
 6 R^1 , R^2 and R^3 may be same or different and are independently selected from the groups
 7 consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 8 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 9 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 10 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 11 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 12 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-\text{C}(\text{O})-\text{R}^1$, $-\text{C}(\text{O})\text{O}-\text{R}^1$, $-\text{C}(\text{O})\text{NR}^1\text{R}^1$, $-\text{S}(\text{O})_m-\text{R}^1$, $-\text{S}(\text{O})_m-\text{NR}^1\text{R}^1$, nitro, $-\text{OH}$, cyano, amino, formyl,
 14 acetyl, halogen, $-\text{OR}^1$, $-\text{SR}^1$, protecting groups or when two R^2 substituents ortho to each
 15 other, may be joined to a form a saturated or unsaturated cyclic ring, which may
 16 optionally include up to two heteroatoms selected from O, NR^1 or S;
 17 wherein P represents oxygen or sulfur;
 18 wherein n represents 0 – 4;
 19 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 20 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;

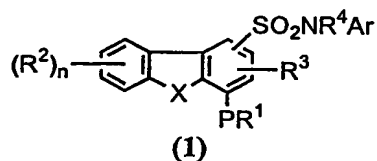
- 21 X is oxygen, S(O)_m or NR⁵;
 22 R⁵ represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 23 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 24 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 25 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 26 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 27 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, -C(O)-R¹, -
 28 C(O)O-R¹, -C(O)NR¹R¹, -S(O)_m-R¹, -S(O)_m-NR¹R¹, nitro, -OH, cyano, amino, formyl,
 29 acetyl, halogen, -OR², -SR² and protecting groups
 30 m is 0, 1 or 2;
 31 Y is -SO₂NR⁴;
 32 R⁴ is hydrogen, substituted or unsubstituted alkyl, hydroxyl, -OR¹, -COOR¹, substituted
 33 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 34 comprising the steps of
 35 (a) chlorosulfonylation of the compound of general formula (26)



- 36 where the symbols are defined in the above
 37 with chlorosulfonic acid to get general formula (28)



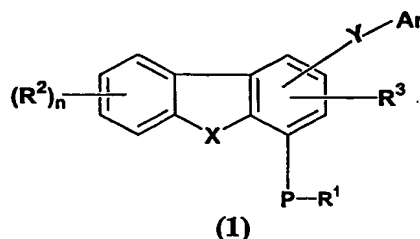
- 39 (b) reacting the compound of general formula (28) with an amine of the formula
 40 ArNHR⁴ to get the novel compounds of formula 1
 41
 42



43

- (c) optionally the compounds of formula 1 are converted into the corresponding N-oxides by the action of a peracid.

61. A method for the preparation of compounds of general formula (1)



wherein:

R^1 , R^2 and R^3 may be same or different and are independently selected from the groups consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl, acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each other, may be joined to form a saturated or unsaturated cyclic ring, which may optionally include up to two heteroatoms selected from O, NR^1 or S;

wherein P represents oxygen or sulfur;

wherein n represents 0 – 4;

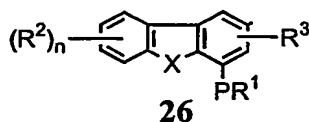
Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;

X is oxygen, $S(O)_m$ or NR^5 ;

R^5 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, -

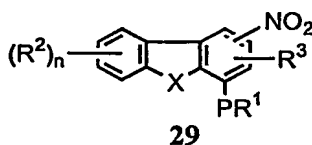
28 $C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl,
 29 acetyl, halogen, $-OR^2$, $-SR^2$ and protecting groups
 30 m is 0, 1 or 2;
 31 Y is $-C(O)NR^4$, $-NR^4SO_2$, $-SO_2NR^4$ or $-NR^4C(O)$;
 32 R^4 is hydrogen, substituted or unsubstituted alkyl, hydroxyl, $-OR^1$, $-COOR^1$, substituted
 33 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 34 and their analogs, their tautomers, their regioisomers, their stereoisomers, their
 35 enantiomers, their diastereomers, their polymorphs, their pharmaceutically acceptable
 36 salts, their N-oxides, their pharmaceutically acceptable solvates and their pharmaceutical
 37 compositions containing them or a pharmaceutical acceptable salts thereof;
 38 which comprises the steps of:

40 (a) nitrating the compound of general formula (26)

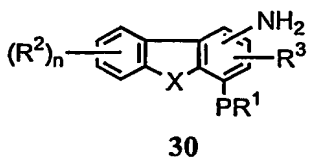


42 where the symbols are defined in the above

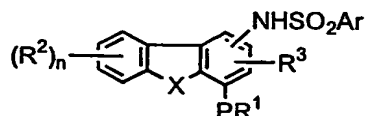
43 to yield the nitro compounds of general formula (29)



46 (b) reacting the compound of general formula (29) with a reducing agent to yield the
 47 amino compounds of general formula (30)

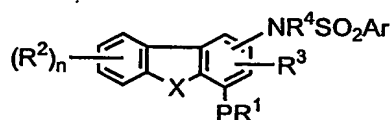


50 (c) reacting the amino compounds of general formula (30) with $ArSO_2Cl$ to yield the
 51 compounds of general formula (31)



31

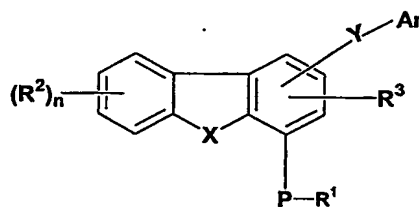
- (d) alkylating the compounds of general formula (31) with an alkylating agent in the presence of a base to yield the compounds of general formula (1); and



(1)

- (e) optionally converting the compounds of formula (1) into the corresponding N-oxides by the action of a peracid.

62. A process for the preparation of compounds of general formula (1)



(1)

wherein:

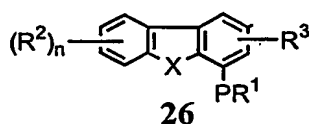
R^1 , R^2 and R^3 may be same or different and are independently selected from the groups consisting of hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl, acetyl, halogen, $-OR^1$, $-SR^1$, protecting groups or when two R^2 substituents ortho to each other, may be joined to form a saturated or unsaturated cyclic ring, which may optionally include up to two heteroatoms selected from O, NR^1 or S;

wherein P represents oxygen or sulfur;

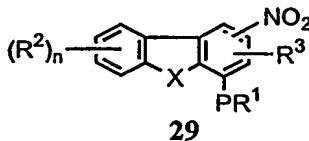
wherein n represents 0 – 4;

- 19 Ar is substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted
 20 or unsubstituted heterocyclic ring or substituted or unsubstituted heteroaryl ring;
 21 X is oxygen, $S(O)_m$ or NR^5 ;
 22 R^5 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted
 23 alkenyl, substituted or unsubstituted alkynyl, substituted or unsubstituted cycloalkyl,
 24 substituted or unsubstituted cycloalkylalkyl, substituted or unsubstituted cycloalkenyl,
 25 substituted or unsubstituted aryl, substituted or unsubstituted arylalkyl, substituted or
 26 unsubstituted heteroaryl, substituted or unsubstituted heterocyclic group, substituted or
 27 unsubstituted heterocyclalkyl, substituted or unsubstituted heteroarylalkyl, $-C(O)-R^1$, $-$
 28 $C(O)O-R^1$, $-C(O)NR^1R^1$, $-S(O)_m-R^1$, $-S(O)_m-NR^1R^1$, nitro, $-OH$, cyano, amino, formyl,
 29 acetyl, halogen, $-OR^2$, $-SR^2$ and protecting groups
 30 m is 0, 1 or 2;
 31 Y is $-NR^4C(O)$;
 32 R^4 is hydrogen, substituted or unsubstituted alkyl, hydroxyl, $-OR^1$, $-COOR^1$, substituted
 33 or unsubstituted aryl, substituted or unsubstituted heterocyclic ring ;
 34 and their analogs, their tautomers, their regioisomers, their stereoisomers, their
 35 enantiomers, their diastereomers, their polymorphs, their pharmaceutically acceptable
 36 salts, their N-oxides, their pharmaceutically acceptable solvates and their pharmaceutical
 37 compositions containing them or a pharmaceutical acceptable salts thereof;
 38 which comprises the steps of;

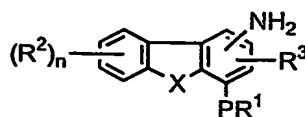
- 39 (a) nitrating the compound of general formula (26)



- 41 to yield the nitro compounds of general formula (29)

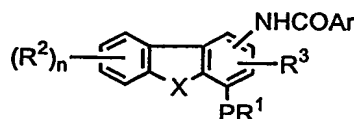


- 43 (b) reacting the compound of general formula (29) with a reducing agent to yield the
 44 amino compounds of general formula (30)



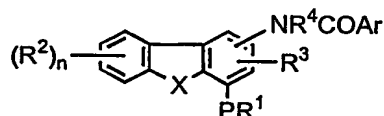
30

- (c) reacting the amino compounds of general formula (30) with ArCOCl or a mixed anhydride of the formula ArCOOCOR⁵ where R⁵ substituted or unsubstituted alkyl, cycloalkyl, aryl, heterocyclic ring, heteroaryl, to yield the compounds of general formula (32)



32

- (d) alkylating the compounds of general formula (32) with an alkylating agent to yield the compounds of general formula (1)



(1)

- (e) optionally converting the compounds of formula (1) into the corresponding N-oxides by the action of a peracid

63. A pharmaceutical composition comprising a compound according to claims 1-51 or 52 and pharmaceutically acceptable salts or solvates thereof as well as pharmaceutically acceptable diluents or carriers.

64. A method of treating inflammatory diseases, disorders and conditions characterized by or associated with an undesirable inflammatory immune response and all disease and conditions induced by or associated with an excessive secretion of TNF- α and PDE-4 which comprises administering to a subject a therapeutically effective amount of a compound according to claims 1-51 or 52.

1 65. A method of treating inflammatory conditions and immune disorders in a subject
2 in need thereof which comprises administering to said subject a therapeutically effective
3 amount of a compound according to claims 1-51 or 52.

1 66. The method according to claim 65 wherein said inflammatory conditions and
2 immune disorders is chosen from the group consisting of asthma, bronchial asthma
3 chronic obstructive pulmonary disease, allergic rhinitis, eosinophilic granuloma,
4 nephritis, rheumatoid arthritis, cystic fibrosis, chronic bronchitis, multiple sclerosis,
5 Crohns disease, psoriasis, urticaria, adult vernal conjunctivitis, respiratory distress
6 syndrome, rheumatoid spondylitis, osteoarthritis, gouty arthritis, uveitis, allergic
7 conjunctivitis, inflammatory bowel conditions, ulcerative colitis, eczema, atopic
8 dermatitis and chronic inflammation.

1 67. The method according to claim 66 wherein said inflammatory condition is an
2 allergic inflammatory condition.

1 68. The method according to claim 67 wherein said inflammatory conditions and
2 immune disorders are selected from the group consisting of inflammatory conditions or
3 immune disorders of the lungs, joints, eyes, bowels, skin and heart.

1 69. The method according to claim 68 wherein said inflammatory condition is chosen
2 from the group consisting of bronchial asthma, nephritis, and allergic rhinitis.

1 70. A method for abating inflammation in an affected organ or tissue comprising
2 delivering to said organ or tissue a therapeutically effective amount of a compound
3 represented by a compound according to claims 1-51 or 52.

1 71. A method of treating diseases of the central nervous system in a subject in need
2 thereof which comprises administering to said subject a therapeutically effective amount
3 of a compound according to claims 1-51 or 52.

1 72. The method according to claim 71 wherein said diseases of the central nervous
2 system are chosen from the group consisting of depression, amnesia, dementia,
3 Alzheimers disease, cardiac failure, shock and cerebrovascular disease.

4

1 73. A method of treating insulin resistant diabetes in a subject in need thereof which
2 comprises administering to said subject a therapeutically effective amount of a compound
3 according to claims 1-51 or 52.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.